

EE1

2022.1

resolução

SD



2022.1

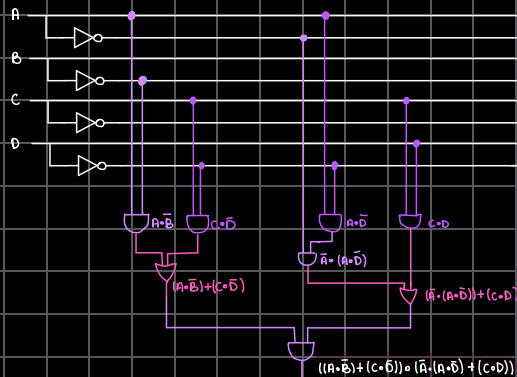
questão 1) $F = ((A \cdot \bar{B}) + (C \cdot \bar{D})) \cdot (\bar{A} \cdot (A \cdot \bar{D}) + (C \cdot D))$

a) tabela verdade

A	B	C	D	1	2	3
0	0	0	0	0	0	0
0	0	0	1	0	0	0
0	0	1	0	1	0	0
0	0	1	1	1	1	0
0	1	0	0	0	0	0
0	1	0	1	0	0	0
0	1	1	0	1	0	0
0	1	1	1	1	1	0
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	1	0	0
1	0	1	1	1	1	0
1	1	0	0	0	0	0
1	1	0	1	0	0	0
1	1	1	0	1	0	0
1	1	1	1	1	1	0

perceba que isso é SEMPRE falso!

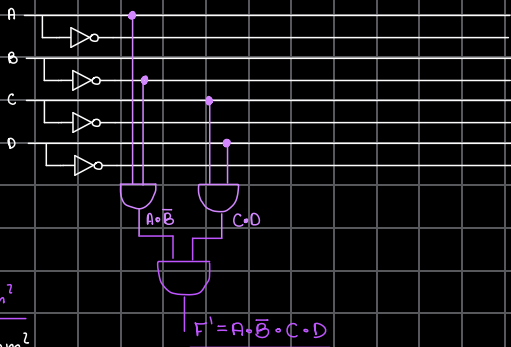
circuito lógico



b)

AB \ CD	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	0	0	0	1
10	0	0	0	0

$F' = A \cdot \bar{B} \cdot C \cdot D$ é o único caso true!



Área da letra a)

NOT = 4 × 3mm = 12
AND = 6 × 10mm = 60
OR = 2 × 8mm = 16
Área total = 88mm²

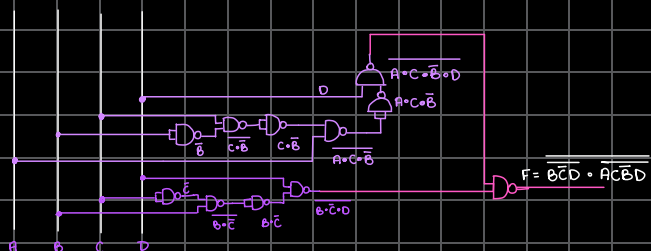
Área da letra b)

NOT = 4 × 3mm²
AND = 3 × 10mm²
Área total = 42mm²

questão 2)

a) $F = (B \cdot \bar{C} + \bar{D}) + A((\bar{C} + B) \cdot \bar{D})$

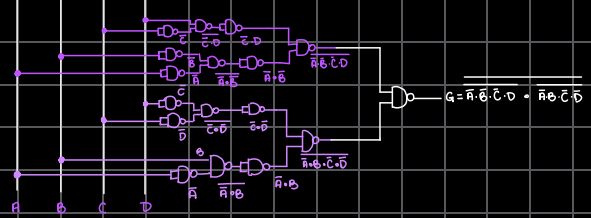
$$\begin{aligned} &= ((B \cdot \bar{C}) + \bar{D}) + A((\bar{C} + B) \cdot \bar{D}) \\ &= ((B \cdot \bar{C}) \cdot D) + A((\bar{C} + B) \cdot D) = ((B \cdot \bar{C}) \cdot D) + (A((\bar{C} + B) \cdot D)) \\ &= (B \cdot \bar{C}) \cdot D + A((\bar{C} + B) \cdot D) \end{aligned}$$



lembrar que $\neg \neg A = A$ e $\neg \neg \neg A = \neg A$

6) $m_3 = 0001 = \bar{A}\bar{B}\bar{C}D$
 $m_4 = 0100 = \bar{A}B\bar{C}\bar{D}$

De Morgan
 $G = \bar{A}\bar{B}\bar{C}D + \bar{A}B\bar{C}\bar{D}$
 $= \bar{A}\bar{B}\bar{C}D + \bar{A}B\bar{C}\bar{D}$



questão 3)

tabela verdade

decimal	N ₃	N ₂	N ₁	N ₀	F	G
0	0	0	0	0	0	1
1	0	0	0	1	0	0
2	0	0	1	0	1	0
3	0	0	1	1	1	1
4	0	1	0	0	0	0
5	0	1	0	1	1	0
6	0	1	1	0	0	1
7	0	1	1	1	1	0
8	1	0	0	0	0	0
9	1	0	0	1	0	1
10	1	0	1	0	0	0
11	1	0	1	1	1	0
12	1	1	0	0	0	1
13	1	1	0	1	1	0
14	1	1	1	0	0	0
15	1	1	1	1	0	1

Ativa para primos
 Ativa para múltiplos de 3

SEM REDUÇÕES

$G = \bar{N}_3\bar{N}_2\bar{N}_1\bar{N}_0 + \bar{N}_3\bar{N}_2N_1N_0 + \bar{N}_3N_2N_1N_0$
 $+ N_3\bar{N}_2\bar{N}_1N_0 + N_3\bar{N}_2N_1\bar{N}_0 + N_3N_2\bar{N}_1N_0$
 $F = \bar{N}_1\bar{N}_2N_1N_0 + \bar{N}_3N_1N_1N_0 + \bar{N}_3N_2\bar{N}_1N_0$
 $+ \bar{N}_2N_1N_1N_0 + N_3\bar{N}_2N_1N_0 + N_2N_2\bar{N}_1N_0$

mapa de karnaugh

saída G REDUZIDA

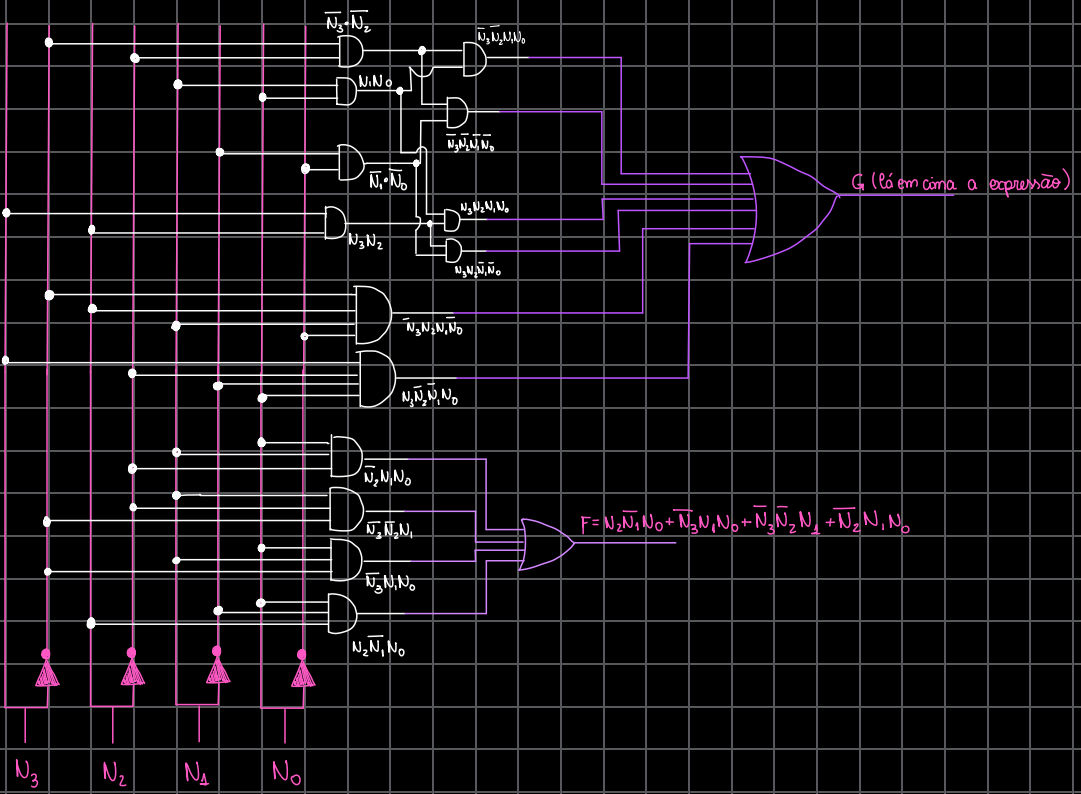
		u_3u_1			
		00	01	11	10
u_1u_0	00	\downarrow	0	\downarrow	0
	01	0	0	0	\downarrow
	11	\downarrow	0	\downarrow	0
	10	0	\downarrow	0	0

NÃO É REDUTÍVEL

saída F REDUZIDA

N_3N_1	N_3N_0	00	01	11	10
00		0	0	0	0
01		0	1	1	0
11		1	1	0	1
10		1	0	0	0

$N_2\bar{N}_1N_0$ # $\bar{N}_3N_1N_1$
 # $\bar{N}_2N_2N_0$ # $\bar{N}_2N_1N_0$
 $F = N_2\bar{N}_1N_0 + \bar{N}_3N_1N_1 + \bar{N}_2N_2N_0 + \bar{N}_2N_1N_0$



questão 4)

mapas de karnaugh para reduzir as expressões:

char	P	Q	R	S	D ₄	D ₃	D ₂	D ₁	
0	0	0	0	0	0	1	1	0	6
1	0	0	0	1	0	1	1	1	7
2	0	0	1	0	1	0	0	1	9
3	0	0	1	1	1	0	0	0	8
4	0	1	0	0	1	0	1	0	A
5	0	1	0	1	0	0	1	0	2
6	0	1	1	0	1	0	1	1	B
7	0	1	1	1	1	1	1	1	F
8	1	0	0	0	0	0	0	1	1
9	1	0	0	1	1	1	0	0	C
A	1	0	1	0	0	0	0	0	0
B	1	0	1	1	1	1	0	1	D
C	1	1	0	0	1	1	1	0	E
D	1	1	0	1	0	0	1	1	3
E	1	1	1	0	0	1	0	1	5
F	1	1	1	1	0	1	0	0	4

D₄: $\bar{P}\bar{Q}\bar{R}\bar{S} + \bar{P}\bar{Q}R\bar{S} + \bar{P}Q\bar{R}\bar{S} + \bar{P}QR\bar{S}$
 $+ \bar{P}QR\bar{S} + \bar{P}QR\bar{S} + \bar{P}QR\bar{S} + \bar{P}QR\bar{S}$

QS \ PQ	00	01	11	10
00	0	1	1	0
01	0	0	0	1
11	1	1	0	1
10	1	1	0	0

$\bar{R}\bar{S}Q + \bar{P}\bar{Q}S + \bar{P}R = D_4$

D₂: $\bar{P}\bar{Q}\bar{R}\bar{S} + \bar{P}\bar{Q}\bar{R}S + \bar{P}\bar{Q}R\bar{S} + \bar{P}\bar{Q}RS$
 $+ \bar{P}QR\bar{S} + \bar{P}QRS + \bar{P}QR\bar{S} + \bar{P}QRS$

QS	PQ	00	01	11	10
00	1	1	1	0	
01	1	1	1	0	
11	0	1	0	0	
10	0	1	0	0	

$\bar{P}Q + \bar{P}\bar{R} + \bar{P}Q\bar{R} = D_2$

D₃: $\bar{P}\bar{Q}\bar{R}\bar{S} + \bar{P}\bar{Q}\bar{R}S + \bar{P}Q\bar{R}\bar{S} + \bar{P}QR\bar{S}$
 $+ \bar{P}QR\bar{S} + \bar{P}QR\bar{S} + \bar{P}QR\bar{S} + \bar{P}QR\bar{S}$

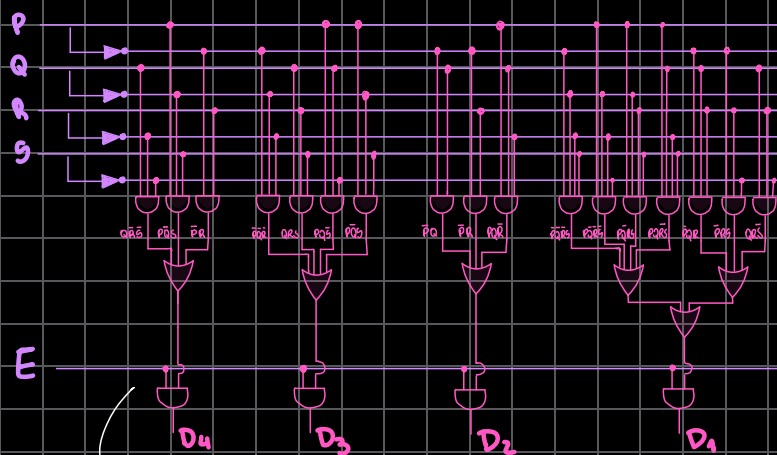
QS\PQ	00	01	11	10
00	1	0	1	0
01	1	0	0	1
11	0	1	1	1
10	0	0	1	0

D₃: $\bar{P}\bar{Q}\bar{R} + QR\bar{S} + PQ\bar{S} + \bar{P}Q\bar{S}$

D₁: $\bar{P}\bar{Q}\bar{R}\bar{S} + \bar{P}\bar{Q}\bar{R}S + \bar{P}\bar{Q}R\bar{S} + \bar{P}\bar{Q}RS$
 $+ \bar{P}QR\bar{S} + \bar{P}QRS + \bar{P}QR\bar{S} + \bar{P}QRS$

QS\PQ	00	01	11	10
00				1
01	1		1	
11		1		1
10	1	1	1	

$\bar{P}\bar{Q}\bar{R}\bar{S} + \bar{P}\bar{Q}\bar{R}S + \bar{P}\bar{Q}R\bar{S} + \bar{P}\bar{Q}RS + \bar{P}QR\bar{S} + \bar{P}QRS + QR\bar{S} = D_1$



Por conta das ANDs, o circuito só ativa se o enable (E) = 1